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PowerForward

Communications and Interoperability

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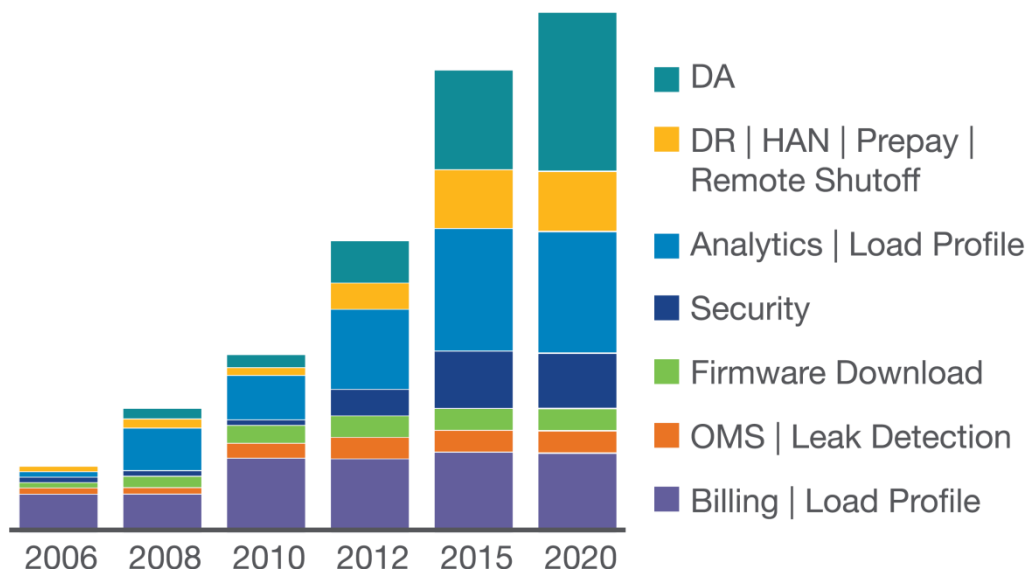
Key questions for a changing environment

- Network Infrastructure
- Interoperability
- Integration



Q: Expandability

Can the network expand over time?



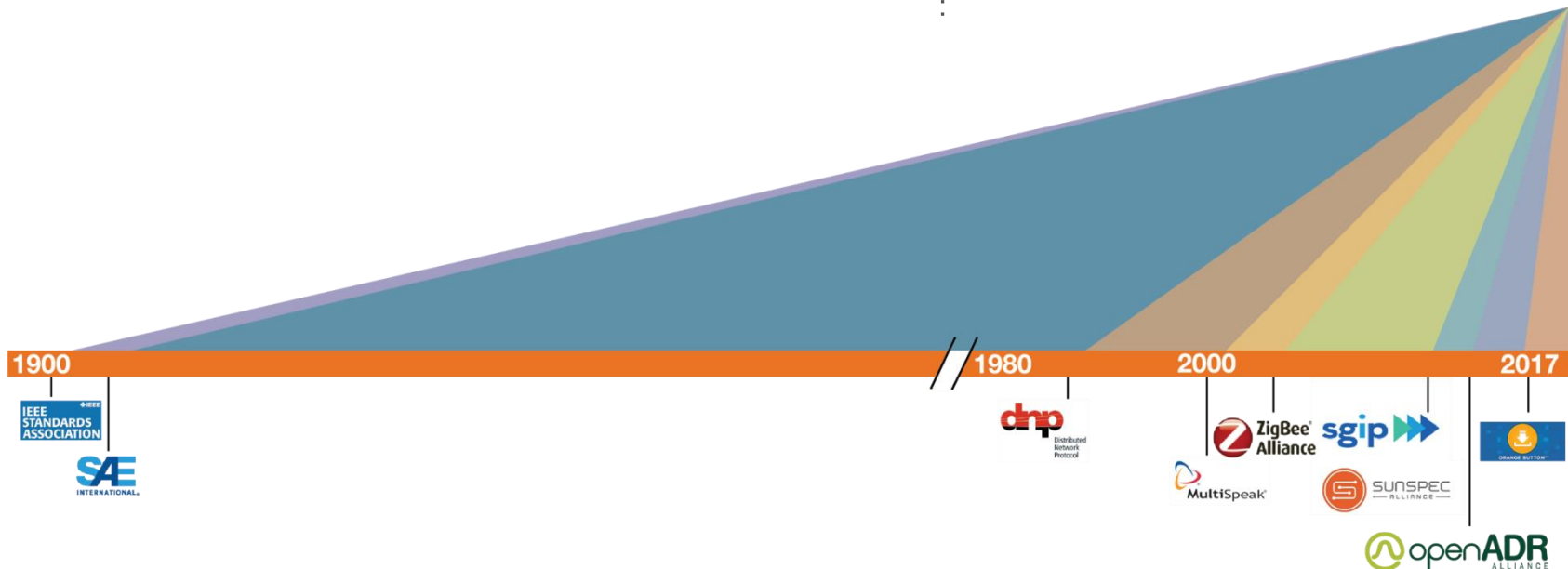
The system needs to support expansion

- Growth
- New Applications
- Data Requirements

Q: Extensibility

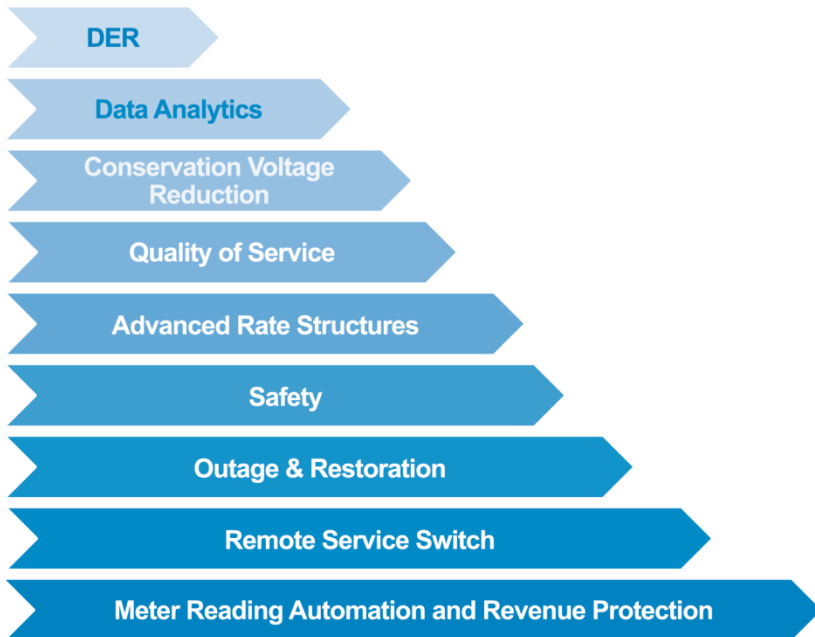
Can the network meet changing standards?

The system needs to add new standards and protocols as they're adopted



Q: Compatibility

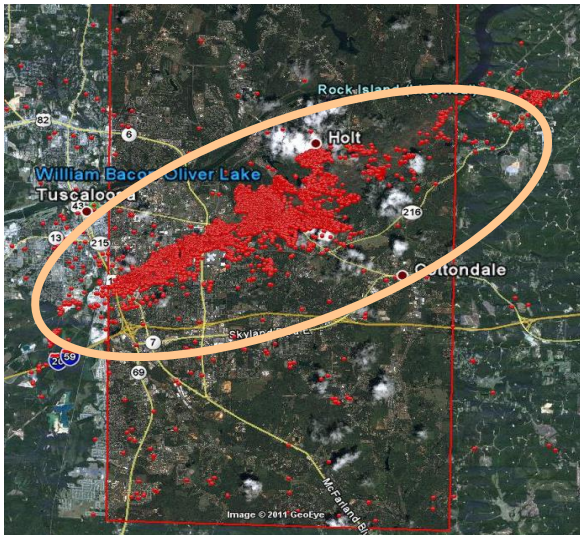
Is the network backwards-compatible and future-ready?



- ❑ The network must keep pace with an evolving grid
- ❑ The network must evolve without stranding existing assets

Q: Resiliency

Can the communications system aid in power restoration?



Actual screenshot of meter outage data displayed on Google Earth map

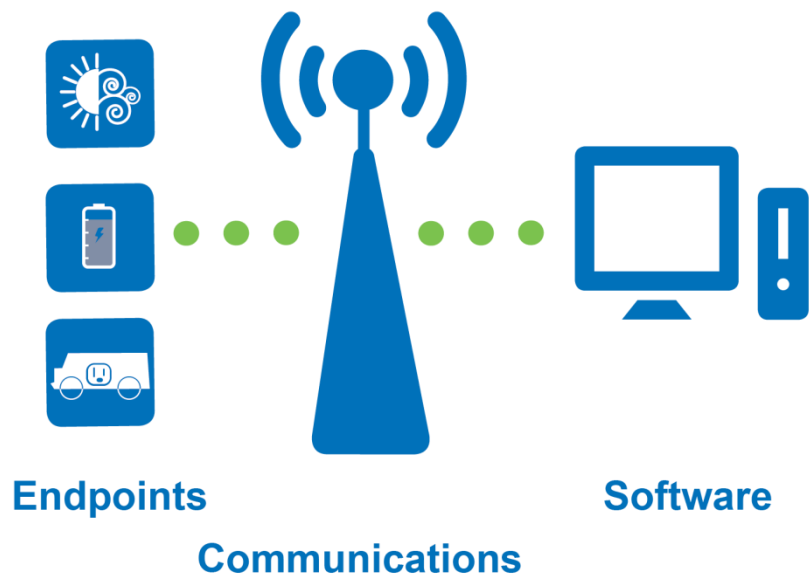
Tuscaloosa Alabama 2011

- 30 tornadoes
- 412,229 customers lost power
- 6,000 distribution poles destroyed
- \$200 million in utility infrastructure damage

- ❑ Disaster recovery is one of a utility's spotlight moments
- ❑ The system must continue to operate during critical times to support restoration

Q: Value

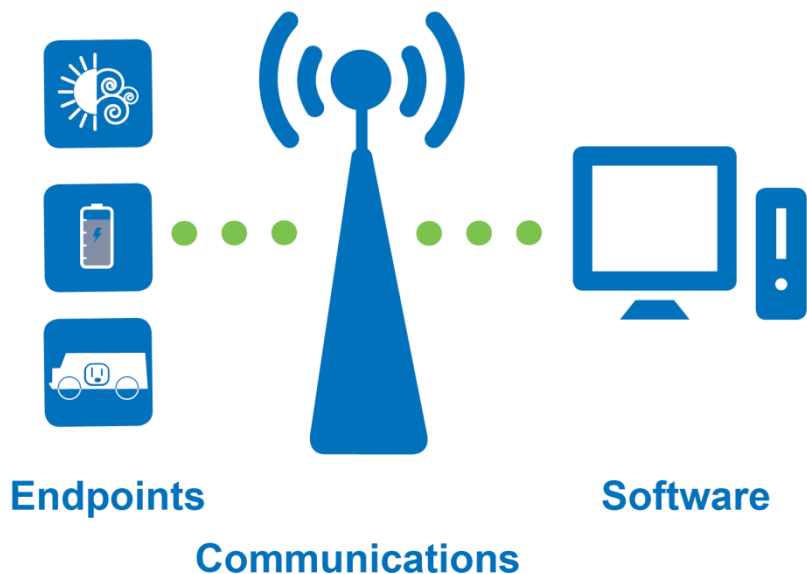
Where does interoperability add the most value?



- ❑ Interoperable communications is not the gateway to a completely interoperable system
 - Communications will and should evolve to meet new application requirements
 - Application level interoperability ensures every device communicates regardless of the generational changes in communication protocols – i.e. 2G to 3G to LTE

Q: Opportunity Cost

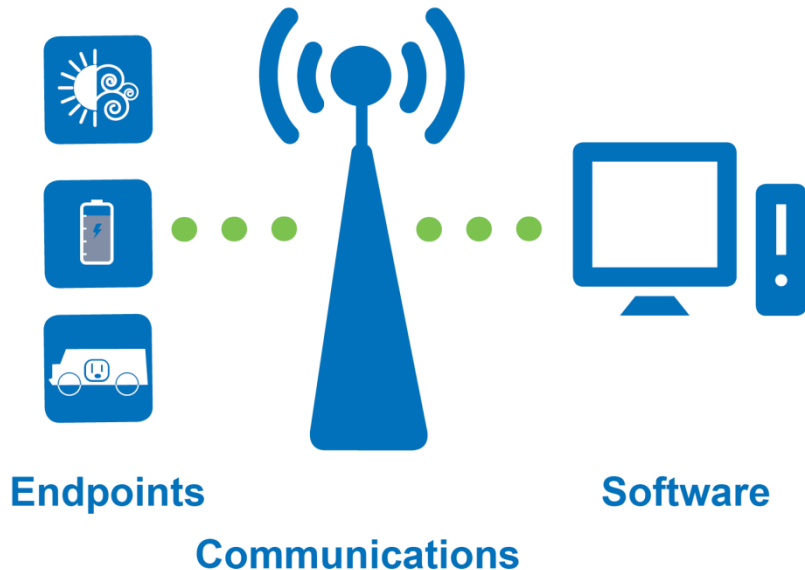
What compromises are made to be locked into a communications protocol?



- ❑ Results in lowest common denominator technology/solution
 - Security
 - Loss of agility to adapt to generational changes
 - Extensive and expensive integration efforts
 - Value of buying communications from multiple vendors diminished by compromises on performance

Q: System Support

What applications/devices/protocols are supported?



- The network has proven additional application support and plans for the future
- Ensure desired protocols and applications operate on the system
- An understanding of the benefits of applications and protocols in order to validate network ability to transport

Q: Proven Ability

Has the solution been tested and the level of end-to-end performance evaluated

- Drive customer satisfaction and value
- Add value throughout the utility organization
- Compare pre- and post-deployment performance

Q: Determining Success

What type of integration is needed to realize utility goals?

- ❑ Define goals: connecting new, old or both technologies
- ❑ Understand the technology required
- ❑ Are the technologies currently available, are they in development, or is integration required
- ❑ Gathering some information will require integration of technology into other devices

Q: Future Opportunities

How can the utility leverage integration?

- Extending asset life
- Multi-utility communication opportunities
- Expand equipment monitoring possibilities

Flexibility is the Key to Manage Change

Changing:

- Population
- Consumer Needs and Choices
- Regulatory
- Technology Landscape
- Generation/Supply
- Industry Consolidation

